

What is claimed is:

1. An image pickup apparatus comprising:

a solid-state imaging device for generating an image signal by carrying out photoelectric conversion of individual pixels at different timings;

an amplifier for amplifying the image signal; and

an automatic level adjusting section for regulating a level of the image signal at a specified level by automatically controlling a charge storage time of said solid-state imaging device and a gain of said amplifier,

wherein said automatic level adjusting section comprises:

a first setting section for setting the charge storage time of said solid-state imaging device at an integer multiple of half a reciprocal of a frequency of a first power supply;

a second setting section for setting the charge storage time of said solid-state imaging device at an integer multiple of half a reciprocal of a frequency of a second power supply;

a switching section for selecting one of said first setting section and said second setting section to set the charge storage time of said solid-state imaging device;

an accumulating section for accumulating a plurality of pixel values of a predetermined line in a frame;

an index calculating section for calculating inter-frame variations of accumulation values obtained by said accumulating section, and for calculating an index for detecting the flicker from the inter-frame variations between a predetermined number of frames; and

a flicker detecting section for detecting flicker in response to the index of said index calculating section, and for

controlling said switching section in response to the detection result of the flicker.

2. The image pickup apparatus according to claim 1, wherein

5        said first setting section sets the charge storage time of said solid-state imaging device at an integer multiple of 1/100 second, and

      said second setting section sets the charge storage time of said solid-state imaging device at an integer multiple of  
10 1/120 second.

3. The image pickup apparatus according to claim 1, wherein said index calculating section calculates the index by accumulating the variations of accumulation values of individual frames over  
15 a predetermined number of frames, which accumulation values are obtained by said accumulating section.

4. The image pickup apparatus according to claim 3, wherein said flicker detecting section compares the index obtained when said  
20 first setting section is in operation with the index obtained when said second setting section is in operation, and controls said switching section in response to a compared result.

5. The image pickup apparatus according to claim 3, wherein said  
25 flicker detecting section compares the index obtained when one of said first setting section and said second setting section is in operation with a predetermined threshold value, and controls said switching section in response to a compared result.

30 6. The image pickup apparatus according to claim 1, wherein said

index calculating section comprises:

a plurality of memories for storing indices calculated from accumulation values obtained by said accumulating section over a predetermined number of frames;

5 a sum calculating section for calculating a sum of the indices of the predetermined number of frames; and

a maximum differential calculating section for calculating a difference between a maximum value and a minimum value of the indices of the predetermined number of frames.

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7. The image pickup apparatus according to claim 1, further comprising a threshold value setting section for setting a predetermined threshold value to be supplied to said flicker detecting section in response to the image signal captured by  
15 said solid-state imaging device, wherein said flicker detecting section detects the flicker by comparing the index with the threshold value.

8. The image pickup apparatus according to claim 7, wherein said  
20 threshold value setting section comprises a look-up table, and sets the threshold value corresponding to the image signal referring to the look-up table.

9. The image pickup apparatus according to claim 1, further  
25 comprising a masking section for masking a control signal supplied from said flicker detecting section to said switching section to halt the switching operation of said switching section.

30 10. The image pickup apparatus according to claim 9, wherein

said masking section masks the control signal to said switching section in response to an accumulation value by said accumulating section, the accumulation value being obtained by accumulating the pixel values over all or part of a frame of the image signal  
5 captured by said solid-state imaging device.

11. The image pickup apparatus according to claim 9, wherein said masking section masks the control signal to said switching section in response to the charge storage time of said  
10 solid-state imaging device.

12. The image pickup apparatus according to claim 9, wherein said masking section masks the control signal to said switching section in response to a gain of said amplifier.  
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13. An automatic level adjusting method applied to an image pickup apparatus including a solid-state imaging device for generating an image signal by carrying out photoelectric conversion of individual pixels at different timings, and an  
20 amplifier for amplifying the image signal, said automatic level adjusting method regulating a level of the image signal at a specified level by automatically controlling a charge storage time of said solid-state imaging device and a gain of said amplifier, and said automatic level adjusting method comprising  
25 the steps of:

accumulating a plurality of pixel values of a predetermined line in a frame;

calculating inter-frame variations of accumulation values, and calculating an index for detecting flicker from the  
30 inter-frame variations between a predetermined number of frames;

detecting the flicker in response to the index; and  
setting, in response to the detection result of the flicker,  
the charge storage time of said solid-state imaging device at  
one of an integer multiple of half a reciprocal of a frequency  
5 of a first power supply and an integer multiple of half a  
reciprocal of a frequency of a second power supply.

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